View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Research Papers in Economics

The University of Adelaide
School of Economics

Research Paper No. 2009-07
March 2009

How Far Has Africa Come in Reducing its Anti-agricultural Policy Bias?

Kym Anderson, William A. Masters, Marianne Kurzweil and Ernesto Valenzuela

The University of Adelaide, School of Economics Working Paper Series No: 0066 (2009-07)

How far has Africa come in reducing its anti-agricultural policy bias?

Kym Anderson (University of Adelaide),
William A. Masters (Purdue University),
Marianne Kurzweil (African Development Bank),
and **Ernesto Valenzuela** (University of Adelaide)

kym.anderson@adelaide.edu.au
wmasters@purdue.edu.au
m.kurzweil@afdb.org
ernesto.valenzuela@adelaide.edu.au

December 2008

Running title: Africa's anti-agricultural policy bias

Author contact details:
Kym Anderson
School of Economics
University of Adelaide
Adelaide SA 5005
Australia
Phone +61 8 8303 4712
Fax +61 8 8223 1460
kym.anderson@adelaide.edu.au

This is a product of a World Bank research project on Distortions to Agricultural Incentives (www.worldbank.org/agdistortions). The authors are grateful for helpful comments from various workshop participants; for the efforts of nearly 40 authors who provided the African country case studies for the Agricultural Distortions project; for computational assistance from a team of assistants led by Ernesto Valenzuela that brought together the global Agricultural Distortions database; and for funding from various World Bank Trust Funds, particularly these provided by the governments of the Netherlands (BNPP) and the United Kingdom (DfID). Views expressed are the authors' alone and not necessarily those of the World Bank, the African Development Bank or their Executive Directors.

Abstract

For decades, earnings from farming in many African countries have been depressed by own-country policies such as export restrictions on cash crop products, as well as by governments of richer countries favoring their farmers with import barriers and subsidies. Both sets of policies have reduced national and global economic welfare, inhibited agricultural trade and economic growth, and may well have added to income inequality and poverty in Africa. During the past two decades, however, numerous African country governments have reduced their sectoral and trade policy distortions, while some high-income countries also have begun reducing market-distorting aspects of their farm policies. This paper provides new estimates of the changing extent of policy distortions to prices faced by African farmers over the past half century. It compares that pattern with similar estimates from Asia and Latin America, before discussing prospects for further pro-poor policy reform of agricultural price and trade policies.

Keywords: Distorted incentives, export taxes in Africa, agricultural and trade policy reforms

JEL codes: F13, F14, Q17, Q18

How far has Africa come in reducing its anti-agricultural policy bias?

In the 1960s and 1970s, many African governments adopted macroeconomic, sectoral, trade and exchange rate policies that directly or indirectly taxed farm households seeking to export their way out of poverty (Bates 1982). This anti-agricultural, anti-trade policy stance, which was also prevalent in other developing country regions up to the early 1980s (Krueger, Schiff and Valdes 1988), has since begun to be reformed. How much has that bias been reduced in Africa as compared with other regions? This matters greatly for economic development and poverty alleviation, because agriculture is the major employer in Africa, especially of the poor, and it is often a key export sector. Relative changes in these policy stances could help explain Africa‘s development experience, including its relatively slow pace of economic growth to the 1980s and its faster income growth and poverty alleviation since then. However, many price distortions remain, and they could be limiting further progress. With 60 percent of Sub-Saharan Africa‘s workforce still employed in agriculture, 39 percent of the population earning less than $1/day, and more than 80 percent of the region‘s poorest households depending directly or indirectly on farming for their livelihoods (World Bank 2007, Chen and Ravallion 2008), policies affecting farmer incentives remain key influences on the pace of economic and social development in Africa.

This paper summarizes results from a large set of country case studies that include new estimates of the extent of distortions within and across countries over time. It is part of a global research project seeking to improve our understanding of agricultural price and trade policy interventions and reforms in Asia, Europe‘s transition economies, Latin America and

the Caribbean as well as Africa.[1] The core of this project is a new set of annual time series estimates of assistance to and taxation of farmers over the past half century for 75 countries that together account for more than 90 percent of the world's population and agricultural output.

From a global poverty perspective, including Africa in the study was crucial because the continent is home to many of the world's poorest people. In 2006 Sub-Saharan Africa accounted for less than 2 percent of global gross domestic product (GDP) and exports and just 4 percent of agricultural GDP, but it also accounted for 12 percent of the world's farmers, 16 percent of agricultural land, and 28 percent of those living on less than US$1 a day (World Bank 2008).

The African sample in this study involves 21 countries that include Egypt (the largest and poorest country in north Africa) plus five countries of eastern Africa (Ethiopia, Kenya, Sudan, Tanzania and Uganda), five countries in southern Africa (Madagascar, Mozambique, South Africa, Zambia and Zimbabwe), five large economies in west Africa (Cameroon, Cote d'Ivoire, Ghana, Nigeria and Senegal), and five smaller economies of west and central Africa for which cotton is a crucial export (Benin, Burkina Faso, Chad, Mali and Togo). In 2000–04 these economies (leaving aside Egypt) together accounted for all but one-tenth of the agricultural value added, farm households, total population and total GDP of Sub-Saharan Africa.[2] Estimates of distortions are provided for as many years as data permit over the past five decades (an average of 43 years), and for an average of 9 crop and livestock products per African country which in aggregate amounts to about 70 percent of the value of their

[1] The regional studies are Anderson and Martin (2009), Anderson and Masters (2009), Anderson and Swinnen (2008), and Anderson and Valdés (2008). Together with comparable studies of high-income countries, they form the basis for a global overview volume (Anderson 2009).

[2] Unfortunately, because of inadequate time series data, our study under-represents the poorest and smallest African countries that are home to many of the _bottom billion' referred to in the recent book by Collier (2007), but some of those omitted least-developed countries will be included in a proposed follow-on project aimed at monitoring current policies, to be conducted jointly by OECD and FAO (www.oecd.org/apdi).

agricultural production.[3] The relative importance of each of our sample countries in the world economy, and the extent of their inequality and poverty, are summarized in Table 1.

Policy choices have had an important influence on the rates of economic growth, structural change and poverty alleviation observed in Africa. Many countries had increasingly severe anti-agricultural and anti-trade biases in their policy regimes in the 1960s and 1970s. The switch to policies that are less biased against farmers and trade began in some countries by the late 1970s but in many others only in the 1980s or even later. The transition is still on-going, and is intermingled with periods of stalling and even of policy reversals, the most notable recent example being Zimbabwe. Agricultural price distortions are not the only target of policy reform of course, but they are a key aspect of economic policy in most African countries and have been increasingly recognized as such in recent years. For example, African heads of state re-acknowledged in Maputo in 2003 the contributions agriculture can make to meeting key Millennium Development Goals, by pledging to raise the government budget expenditure on agriculture to 10 percent by 2008. Donor support to Africa is also giving much more attention to agricultural public investments than it had in the closing decades of the 20th century. The national economic benefits of such new investments in support of the sector will be greater, the less distorted are prices faced by farmers. This underlines the importance of having more reliable empirical information on the extent of such distortions, as NEPAD (New Partnership for Africa‘s Development) is to host in 2009 a high-level meeting to review progress in implementing the Maputo declaration and to examine what more can be done to build a competitive and productive agricultural sector.

This paper begins with a brief summary of the methodology used by the authors of the individual case studies to estimate the nominal rate of assistance (NRA), the corresponding consumer tax equivalent (CTE) facing domestic buyers of agricultural products, the relative

[3] The time series, product and country coverage greatly exceed that of the earlier study by Krueger, Schiff and Valdes (1991), which focused on just 3-5 crops during the 1960-84 period in only 2 North African and 2 Sub-Saharan African countries (Egypt and Morocco, and Ghana and Zambia).

rate of assistance (RRA) between the farm and nonfarm tradable sectors, and the international trade bias index (TBI) for farm products. A synopsis of the empirical results showing the changing extent of price distortions is then provided for each country, and the continental averages are compared with those of Asia and Latin America. The paper concludes by drawing out implications of the findings, including for poverty and inequality and for possible future directions of policies affecting agricultural incentives in Africa.

Methodology for measuring rates of assistance and taxation

The nominal rate of assistance is defined as the percentage by which government policies have raised gross returns to farmers above what they would be without the government's intervention (or lowered them, if the NRA is negative). Similarly, the consumer tax equivalent is the percentage by which policies have raised prices paid by consumers of agricultural outputs. Negative values imply net taxation of farmers, or subsidies to consumers. The NRA and CTE will be identical if the sole source of government intervention is a trade measure and the two are measured at the same point in the value chain, but in general there will also be some domestic producer or consumer taxes or subsidies to differentiate them.[4] They are similar to the OECD (2007) producer and consumer support estimates (PSE and CSE), but an important difference is that they are expressed as a percentage of the undistorted (e.g., border) rather than the distorted price.

Care is needed in estimating the NRA or CTE for an individual industry in countries where trade costs are high, pass-through along the value chain is affected by imperfect competition, and markets for foreign currency have been distorted at various times and to varying degrees in the past. Attention also needs to be given to how policy is actually implemented. Most distortions in markets for tradable goods come from trade measures, such as a tariff (or occasionally a subsidy) imposed on the import price or an export tax imposed at the country's border, or quantitative restrictions on trade. These are captured in the NRA and CTE at the point in the value chain where the product is first traded. To estimate the NRA for

[4] Our definition of a policy-induced price distortion follows Bhagwati (1971) and Corden (1997) and includes any policy measure at a country's border (such as a trade tax or subsidy, a quantitative restriction on trade, or a dual or multiple foreign exchange rate system, assuming the country is small enough to have no monopoly power in international markets), or any domestic producer or consumer tax/subsidy/restraint on output, intermediate inputs or primary factors of production (except where needed to directly overcome an externality, or where it is set optimally across all products or factors, for example as a value added tax to raise government revenue). Chapter 4 of Corden (1997) deals with the possibility that trade taxes may be part of the optimal tax structure for raising government revenue in an underdeveloped economy (see end of this section).

a typical farmer, authors of the country studies estimated or guessed the extent of pass-through back to the farm gate, and added any domestic farm output subsidies. To obtain the CTE for a typical consumer, they also added any product-specific domestic consumer taxes or subsidies to the distortion from border prices.

NRA and CTE estimates were made for each of the country's major farm products, in an attempt to cover at least 70 percent of the total gross value of farm production at undistorted prices. This target degree of coverage is similar to that for the OECD's PSEs. Unlike the OECD, however, in this project we do not routinely assume that the nominal assistance for covered products would apply equally to non-covered farm products. This is because in developing countries the agricultural policies affecting the non-covered products are often very different from those for the chosen covered products. For example, nontradables among non-covered farm goods (often highly perishable or low-valued products relative to their transport cost) are often not subject to direct distortionary policies. The authors of the country case studies were asked to provide three sets of _guesstimates' of the NRAs for that 30 percent of farm products not covered via direct price comparisons, one each for the import-competing, exportable and nontradable products not covered. Weighted averages for all agricultural products were then generated, using the gross values of production at unassisted prices as weights.[5] For countries that also provide non-product-specific agricultural subsidies or taxes, such net assistance is then added to product-specific assistance to get an NRA for total agriculture, and also for tradable agriculture for use in generating the Relative Rate of Assistance (RRA, defined below).

In addition to these average NRAs, it is important to provide also a measure of its dispersion or variability across products, because a set of dispersed distortions is more costly than a uniform rate of price distortion for each product. The cost of dispersion is even larger

[5] Weighted averages for just the covered products are also provided, for those who wish to ignore (or substitute their own estimates of) NRAs for non-covered goods.

when there is a greater degree of substitution in production (Lloyd 1974). Land and labor is often specific to agriculture but highly transferable among farm activities, so one might expect variation of NRAs across farm products to be quite costly. A simple indicator of this kind of dispersion is the standard deviation of the NRA among covered products.

Each industry is classified either as import-competing, or a producer of exportables, or as producing a nontradable (with its status sometimes changing over the years), so that it is possible to generate for each year the weighted average NRAs for the two different groups of tradables. Those NRAs are used to generate a trade bias index, TBI, defined as:

$$(1) \qquad TBI = (1+NRAag_x/100)/(1+NRAag_m/100) - 1$$

where $NRAag_m$ and $NRAag_x$ are the average percentage NRAs for the import-competing and exportables parts of the agricultural sector. The TBI indicates in a single number the extent to which the typically anti-trade bias (negative TBI) in agricultural policies changes over time.

Farmers are affected not just by prices of their own outputs but also, albeit indirectly via changes to factor market prices and the exchange rate, by the incentives nonagricultural producers face. That is, it is *relative* prices and hence *relative* rates of government assistance that affect producer incentives. More than seventy years ago Lerner (1936) proved his Symmetry Theorem which showed that in a two-sector economy, an import tax has the same effect as an export tax. This carries over to a model that also includes a third sector producing nontradables, to a model with imperfect competition, and regardless of the economy‘s size (Vousden 1990, pp. 46-47). If one assumes that there are no distortions in the markets for nontradables and that the value shares of agricultural and non-agricultural nontradable products remain constant, then the economy-wide effect of distortions to agricultural incentives can be captured by the extent to which the tradable parts of agricultural production are assisted or taxed relative to producers of other tradables. By generating estimates of the

average NRA for non-agricultural tradables, it is then possible to calculate a Relative Rate of Assistance, RRA, defined in percentage terms as:

(2) $$RRA = 100[(1+NRAag^t/100)/(1+NRAnonag^t/100) - 1]$$

where $NRAag^t$ and $NRAnonag^t$ are the production-weighted average percentage NRAs for the tradable parts of the agricultural and non-agricultural sectors, respectively. Since the NRA cannot be less than -100 percent if producers are to earn anything, neither can the RRA (assuming $NRAnonag^t$ is positive). And if both of those sectors are equally assisted, the RRA is zero. This measure is useful in that if it is below (above) zero, it provides an internationally comparable indication of the extent to which a country's policy regime has an anti- (pro-) agricultural bias.

Exchange rate distortions generated by dual or multiple exchange-rate regimes are considered when calculating NRAs and CTEs, following the methodology outlined in Anderson et al. (2008). These have been important in many African countries, particularly during the 1970s and 1980s, making the absolute magnitude of their estimated (typically) positive NRAs for importables and (typically) negative NRAs for exportables larger than they otherwise would have been.

While the NRAs and RRAs can be a guide to the extent of welfare-reducing resource misallocation caused by price-distorting policies, it should be kept in mind that other considerations can also affect the welfare cost of those policies. Corden (1997) reminds us of at least two worth keeping in mind. One is that a country may have a sufficiently high share of global production of a particular product as to have some degree of monopoly power in the international market in the short run. Any such power is likely to be much lower in the longer run, however, because of supply response capabilities of other countries. In any case, one purpose of measuring the difference between domestic and border prices is to provide a price wedge for use in global economy wide models that are capable of estimating the national

economic welfare effects (including via a change in the country's international terms of trade) of removing such a wedge. The other consideration worthy of mention is that a country may be so underdeveloped that the cost of raising essential tax revenue to finance public goods is prohibitive other than via trade taxes. In that case, and assuming a country has no long-run monopoly power in the global market for any of its exported products, the optimal policy would be a uniform export tax on every exportable.[6]

Estimates of policy-induced distortions in Africa

We begin with the nominal rates of assistance to agriculture, and then compare them with the nominal rates for non-agricultural tradables by calculating the relative rates of assistance.

Nominal rates of assistance to agriculture

Agricultural price, trade and exchange rate policies have reduced the earnings of African farmers substantially. The average rate of taxation as measured by the weighted average NRA was less than 8 percent at the time many Africa countries achieved independence around 1960, but then rose sharply during the 1960s and 1970s as interventions became more severe. Reforms have since reduced the average extent of taxation back to its level of the early 1960s. There was even a brief period in the mid-1980s when a combination of policy reforms

[6] See Corden (1997, Ch. 4). In principle an alternative measure could be a uniform tax on every imported product, but in practice that is likely to involve higher collection costs because (a) countries tend to export far fewer products than they import and (b) importables are likely to be more easily smuggled than exportables for countries whose exports are mainly bulky, low-priced primary products. If tax raising was the sole motivation for intervention at the border, there would be no role for quantitative restrictions (QRs) on trade. In practice QRs and uneven rates of taxation of both exports and imports have been as commonplace in African as in other developing countries, suggesting revenue raising is not the only motive for the trade policies observed. This study's provision of NRA and CTE estimates hopefully will stimulate a public finance economist to analyse the appropriateness or otherwise of past interventions as part of an optimal tax structure.

and low international commodity prices brought the region‘s weighted average agricultural NRA to near zero (table 2).

Africa-wide averages hide considerable diversity within the region, however. The major reductions in taxing of farmers has been in such countries as Ghana,Uganda, Tanzania, Cameroon, Senegal and Madagascar, while in Mozambique and to a lesser extent Kenya there has been a transition from taxing to supporting farmers. The opposite transition, from slight support to slight taxation, has occurred in Nigeria; and the degree of taxation is still heavy in Cote d‘Ivoire, Zambia and Zimbabwe.

There is also much within-country dispersion of product NRAs, as shown in table 3 by their standard deviation around the weighted mean NRA for covered agricultural products in each country. This dispersion was highest in the middle of our 50-year period, when the NRAs were most distorting, but even after the recent reforms the intra-country dispersion is no less on average than it was at the beginning of the period. Almost all of that dispersion comes from tradables, because governments tend to intervene much less in markets for nontradable farm products. This raises questions as to how far from the optimum was the structure of trade taxes from the viewpoints of exploiting any monopoly power in global markets and efficient tax revenue raising (answers to which are beyond the scope of the present study).

Variation among products in their regional weighted average NRAs has a similar pattern in Africa as in Asia and Latin America: assistance is among the highest for the rice pudding ingredients of sugar, rice and milk, and is most negative for tropical cash crops such as coffee, cotton, cocoa and tobacco (table 4).

Across countries, there is considerable diversity of national average NRAs too. This is evident from the bottom of table 2: NRA averages for the agricultural sector became more similar between the latter 1950s and the early 1970s, then less similar through to the latter

1980s, and then more similar again so that by 2000-04 this type of NRA dispersion was back to what it had been in the early 1960s.

Another very important type of variation is differential treatment of import-competing and exportable products, in a way that often favors self-sufficiency. The extent of anti-trade bias is shown in figure 1, as the gap between the average NRAs for import-competing and exportable products. This gap remained sizable from 1960 to the early 1980s before enlarging briefly and then narrowing. The reduction in the degree of anti-trade bias shown in figure 1 is reflected in a lower share of trade taxes in total government revenues since 1980 (see World Bank 2008). One reason for declining taxation of trade is that farmers have substituted away from production of heavily-taxed crops. Since the late 1970s, the share of tradable farm products that are exportables has fallen from two-thirds to just over one-half (from 67 to 54 percent in 2000-04), which has helped bring the aggregate NRA towards zero (see dashed line in figure 1). Even so, significant constraints on trade continue to be imposed at the border.

In summary, the level and dispersion of agricultural NRAs confirm that there has been substantial reform towards less distortion of farmer incentives since the 1980s. However, they also suggest that there are still many opportunities for welfare-improving policy through improving resource allocation within and between countries‘ agricultural sectors.

Consumer tax equivalents of agricultural policies

If there were no farm input distortions and no domestic output price distortions so that the NRA was entirely the result of border measures such as an import or export tax or restriction, and there were no domestic consumption taxes or subsidies in place, then the CTE would equal the NRA for each covered product. Even though that is the case in numerous African

countries, the value of consumption weights used in getting the CTEs are quite different from the value of production weights used for getting weighted average NRAs (both measured at undistorted prices). That is particularly so for those countries exporting cash crops in order to import staple foods. Yet even though the average CTEs are somewhat different from the average NRAs for numerous countries, the weighted average CTE for the region as a whole has moved much like the regional NRA: starting at around -10 percent at the time of independence, falling to -17 percent (that is, a 17 percent consumer subsidy equivalent) by the early 1970s, and then gradually lessening and eventually reaching close to zero (with a blip in the latter 1980s when Egypt overshot in its reform efforts to reduce the suppression of domestic food prices just when the international price of food fell to record low levels). The variance in both national CTEs within countries and in product CTEs across countries also rose before the reforms and fell after the latter 1980s (see Anderson and Masters 2009, table 1.20).

Assistance to non-farm sectors and relative rates of assistance

The anti-farm policy biases of the past were due to not just agricultural policies but also policies affecting mobile resources engaged in other sectors. For example, to the extent that protection to manufacturing also has declined over time, the relative burden on agriculture has diminished even more than the agricultural NRA suggests.

The World Bank study aimed to capture inter-sectoral effects in the tradables part of the economy through using the NRA also for non-agricultural products to generate the relative rate of assistance to producers of farm as compared with nonfarm tradable goods. For want of reliable data, the estimates of the NRA for non-farm tradables rely mainly on import tariffs. That means they miss in some cases the additional protective effect of import

quotas/licenses and other quantitative restrictions on imports, and in other cases may miss any taxing of non-farm exportables such as minerals or petroleum.[7] In the absence of more reliable estimates, it is implictly assumed that the non-measured protective effect of quantitative restrictions on imports exactly offsets any non-measured taxes or quantitative restrictions on exports of nonfarm tradables.

The estimated NRAs for nonfarm tradables are non-trivial: their unweighted average among the African focus countries rose from around 12 percent in the 1960s to 27 percent during 1975-84 before declining to around 15 percent during the most recent decade or so. As a result, the unweighted RRA is lower and dips even more in the middle of the studied period (to -42 percent) than does the NRA for agriculture, before returning at the end of the period to around the -20 percent it was in the early 1960s (figure 2(a)). These trends are more muted when country rates are weighted by undistorted value of agricultural production, as shown in figure 2(b). The difference between the two parts of figure 2 reflects the wide differences in the size of farm output across African countries: in 2000-04, Nigeria accounted for one-fifth, three other countries (Egypt, Ethiopia and Sudan) for one-tenth each, and South Africa for over 7 percent, such that the other 16 countries accounted for barely two-fifths of all focus African countries‘ agricultural output.

Even after the reforms since the 1980s, only three of those focus countries had a set of incentives in 2000-04 that was neutral as between agriculture and other tradable sectors, namely South Africa, Mozambique and Kenya. But none other than Zimbabwe had a worse set of intersectoral distortions in 2000-04 than in the 1970s, in the sense that their RRAs were closer to zero in the earlier period.

[7] In most countries the mining sector‘s production value is small relative to that of manufacturing, so the weight of minerals and energy raw materials in nonfarm tradables production used to generate NRA_{nonag} also is small. Nonetheless, as and when better estimates of distortions to non-farm sectors become available they can be inserted in the national spreadsheets provided at www.worldbank.org/agdistortions to revise the RRA estimates. On the greater complexities of estimating the taxing of mining in developing countries, see Otto et al. (2006).

Thus in addition to the slight reduction in the anti-trade bias of agricultural policies, depicted in figure 1, there has been a non-trivial reduction in the anti-agricultural bias in Africa's policy regimes (figure 2). A way of summarizing that combined progress in reform is provided in figure 3, which shows values of agriculture's trade bias index (TBI) on the horizontal axis and the RRA on the vertical axis. An economy with no anti-agricultural bias (RRA = 0) and no anti-trade bias within the farm sector (TBI = 0) would be located at the intersection of the two axes in the upper right-hand corner. In 1975-79, South Africa was the only economy anywhere near that point, and most other Sub-Saharan African economies were far to the southwest of it, indicating both an anti-agricultural bias and an anti-trade policy bias within the sector. In 2000-04, by contrast, Kenya and Nigeria were also close to that neutrality point, and all the other countries shown were far closer than they were in the late 1970s. This is not to say there are few distortions left within the agricultural sector though, for two reasons. One is that the RRA and TBI values, in the ranges -20 to -40 and -0.2 to -0.4, respectively, are not small. The other reason is that within most countries' agricultural sector there is still a wide dispersion of product NRAs. Note also in figure 3 that the 2000-04 values fit roughly along a 45-degree line, as the tax burden on agriculture in these countries consists primarily of taxes on trade.

Africa compared with other regions

Trends in intersectoral RRAs for Africa, Asia and Latin America are summarized in figure 4, showing that other regions have had similar – but even steeper – upward trends in their RRAs over most of the past four decades. The same is true of their agricultural NRAs. These similarities suggest that common political economy forces are at work. Indeed, the tendency for those intervention rates to be positively correlated with per capita income and revealed

comparative advantage in trade (for reasons suggested by Anderson and Hayami 1986 and Anderson 1995) is confirmed statistically, using individual product variables to generate multiple regression equations with country and time fixed effects (table 6). Indeed the African regression results are just as statistically significant as those for Asia and even more than those for Latin America (see Chapter 1 of both Anderson and Martin 2009 and Anderson and Valdés 2008).

Have government interventions stabilized domestic food prices?

Leaving aside the issue of differences between trend levels of domestic and international prices, to what extent have domestic food price *fluctuations* been modified by breaking the link between the internal and external price series? There are various ways of addressing that question. Here we use just three simple indicators, for the period 1970 to 2004. In each case we convert domestic prices to US dollars with the equilibrium exchange rate used to generate NRAs, and then we express all prices in real terms by converting to 2000 dollars using the US GDP deflator. The indicators are all ratios of a domestic to an international price measure, the measures themselves being: the standard deviation of that price around its period mean; the coefficient of variation in that price (its standard deviation divided by its period mean); and the standard deviation of year-on-year price changes, known as the z-statistic.[8] The international prices used here reflect the same reference market for all countries, rather than the country's own border price.

[8] To be precise, the z-statistic is the square root of the average squared deviation of the price from its value lagged one period, or the first differences in price. See Schiff and Valdes (1992, Appendix 3-2) for an earlier application

Each indicator provides a different perspective on price variability. The ratio of standard deviations (SD) is directly comparable to the ratio of the z-statistic (Z), with the former capturing price differences between each year and the mean of all years, and the latter capturing price differences between each year and the previous year. The ratio of coefficients of variation (CV) uses the same information as SD, but controls for the period-average price level.

These indicators are shown for five key products in Table 7. They suggest that, on average for our sample of African countries, domestic prices over the 1970-2004 period have indeed been more stable than the international reference prices for all of those products except maize. Domestic prices typically fluctuate less than international reference price in other regions as well. Developing countries as a whole have much more price stability than Africa in maize, and roughly similar levels of price stability for the other crops. High-income countries have more stability than Africa in sugar as well as maize. For cotton and rice, the high-income countries have higher standard deviations over time, but their price levels are so much higher that their CVs are actually smaller than in Africa.

Summary and conclusions

Each of the African country case studies, reported in Anderson and Masters (2009), provides detailed insights into Africa‘s wide variety of country experiences. Aggregating their results to characterize all of Africa necessarily obscures much of that detail, but its virtue is that it allows some generalizations. The principal findings are the following.

- Since the 1980s, African governments have removed much of their earlier anti-agricultural and anti-trade policy biases;

- Substantial distortions remain, so own-country policies continue to dampen farmer returns in Africa, unlike in Asia and Latin America where on average the policy regime has become neutral;
- African farmers have become less taxed in part because of the changing trade orientation of African agriculture, with the decline in the share of output that is exportable and a corresponding rise in the share from import-competing agricultural industries; and
- Differences across commodities and countries in their NRAs and RRAs have become smaller since the 1980s but they are still very substantial, including differences in rates for exportables and import-competing sub-sectors.

These results suggest that, notwithstanding recent reforms, there remains plenty of scope for improving the efficiency of agricultural resource use in Africa by moving towards lower and more uniform assistance/taxation rates within the farm sector, and between countries within the region. In particular, reducing further the anti-trade bias within the agricultural sector could boost agricultural earnings of the more-productive farmers.

Based on the experience of agricultural policy transitions in other regions, though, care is needed to ensure there is not _overshooting' as export taxation is reduced. It is not uncommon for governments in growing economies to be concerned about farm household incomes falling behind those of nonfarm households, and of export-oriented farmers doing better than import-competing ones. Yet increasingly protecting import-competing agricultural industries can be just as wasteful, in terms of resource misallocation and slower national economic growth, as taxing agricultural exporters.

Income distributional issues can be addressed in far more efficient ways than by import protectionism. The labor market itself has alleviated income gaps in parts of Africa

and Asia: some members of farm households work full- or part-time off the farm and repatriate part part of their higher earnings back to those remaining on the farm (Otsuka and Yamano 2006, World Bank 2007). Concerted government interventions through targeted social policy measures can also provide more efficient and effective ways to reduce gaps between farm and nonfarm incomes – and at the same time raise national incomes overall (Winters, McCulloch and McKay 2004). This is especially so if such measures are accompanied by improvements in market institutions and well-targeted investments in new farm technologies and rural public goods such as basic education and health and transport and communication infrastructure (Fan 2008).

References

Anderson, K. (1995), "Lobbying Incentives and the Pattern of Protection in Rich and Poor Countries", *Economic Development and Cultural Change* 43(2): 401-23, January.

Anderson, K. (ed.) (2009), *Distortions to Agricultural Incentives: A Global Perspective, 1955 to 2007,* London: Palgrave Macmillan and Washington DC: World Bank (forthcoming).

Anderson, K., J. Croser, S. Nelgen and E. Valenzuela (2008), "Distortions to Key Commodity Markets", Ch. 11 in Anderson (2009).

Anderson, K., Y. Hayami and others (1986), *The Political Economy of Agricultural Protection: East Asia in International Perspective*, London: Allen and Unwin.

Anderson, K., M. Kurzweil, W. Martin, D. Sandri and E. Valenzuela (2008), "Measuring Distortions to Agricultural Incentives, Revisited", *World Trade Review* 7(3): 675-704, October.

Anderson, K. and W. Martin (eds.) (2009), *Distortions to Agricultural Incentives in Asia,* Washington DC: World Bank.

Anderson, K. and W. Masters (eds.) (2009), *Distortions to Agricultural Incentives in Africa*, Washington DC: World Bank (forthcoming).

Anderson, K. and J. Swinnen (eds.) (2008), *Distortions to Agricultural Incentives in Europe's Transition Economics,* Washington DC: World Bank.

Anderson, K. and A. Valdés (eds.) (2008), *Distortions to Agricultural Incentives in Latin America,* Washington DC: World Bank.

Anderson, K. and E. Valenzuela (2008), *Global Estimates of Distortions to Agricultural Incentives, 1955 to 2007*, data spreadsheet available at www.worldbank.org/agdistortions

Bates, R.H. (1981), *Market and States in Tropical Africa: The Political Basis of Agricultural Policies*, Berkeley: University of California Press.

Bhagwati, J.N. (1971), "The Generalized Theory of Distortions and Welfare", in *Trade, Balance of Payments and Growth,* edited by J.N. Bhagwati et al., Amsterdam: North-Holland.

Chen, S, and M. Ravallion (2008), "The Developing World is Poorer Than We Thought, But No Less Successful in the Fight Against Poverty", Policy Research Working Paper 4703, World Bank, Washington DC, August.

Collier, P. (2007), *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It,* London: Oxford University Press.

Corden, W.M. (1997), *Trade Policy and Economic Welfare* (second edition), Oxford: Clarendon Press.

Fan, S. (2008), *Public Expenditures, Growth and Poverty in Developing Countries: Issues, Methods and Findings,* Baltimore: Johns Hopkins University Press.

Krueger, A.O., M. Schiff and A. Valdés (1988), "Measuring the Impact of Sector-specific and Economy-wide Policies on Agricultural Incentives in LDCs", *World Bank Economic Review* 2(3): 255-272.

Krueger, A.O., M. Schiff and A. Valdés (1991), *The Political Economy of Agricultural Pricing Policy*, *Volume 3: Africa and the Mediterranean*, Baltimore: Johns Hopkins University Press for the World Bank.

Lerner, A. (1936), "The Symmetry Between Import and Export Taxes", *Economica* 3(11): 306-13, August.

Lloyd, P.J. (1974), "A More General Theory of Price Distortions in an Open Economy", *Journal of International Economics* 4(4): 365-86, November.

OECD (2007), *Agricultural Policies in OECD Countries: Monitoring and Evaluation 2007*, Paris: Organization for Economic Cooperation and Development.

Otsuka, K. and T. Yamano (2006), "Introduction to the Special Issue on the Role of Nonfarm Income in Poverty Reduction: Evidence from Asia and East Africa", *Agricultural Economics* 35 (supplement): 373-97, November.

Otto, J., C.B. Andrews, F. Cawood, M. Doggett, P. Gujm, F. Stermole, J. Stermole, and J. Tilton (2006), *Mining Royalties: A Global Study of their Impact on Investors, Government, and Civil Society*, Washington DC: World Bank.

Sandri, D., E. Valenzuela and K. Anderson (2007), "Economic and Trade Indicators for Africa" Agricultural Distortions Working Paper 21, World Bank, Washington DC, December. Posted at www.worldbank.org/agdistortions

Schiff, M. and A. Valdes (1992), *The Political Economy of Agricultural Pricing Policy, Volume 4: A Synthesis of the Economics in Developing Countries,* Baltimore: Johns Hopkins University Press for the World Bank.

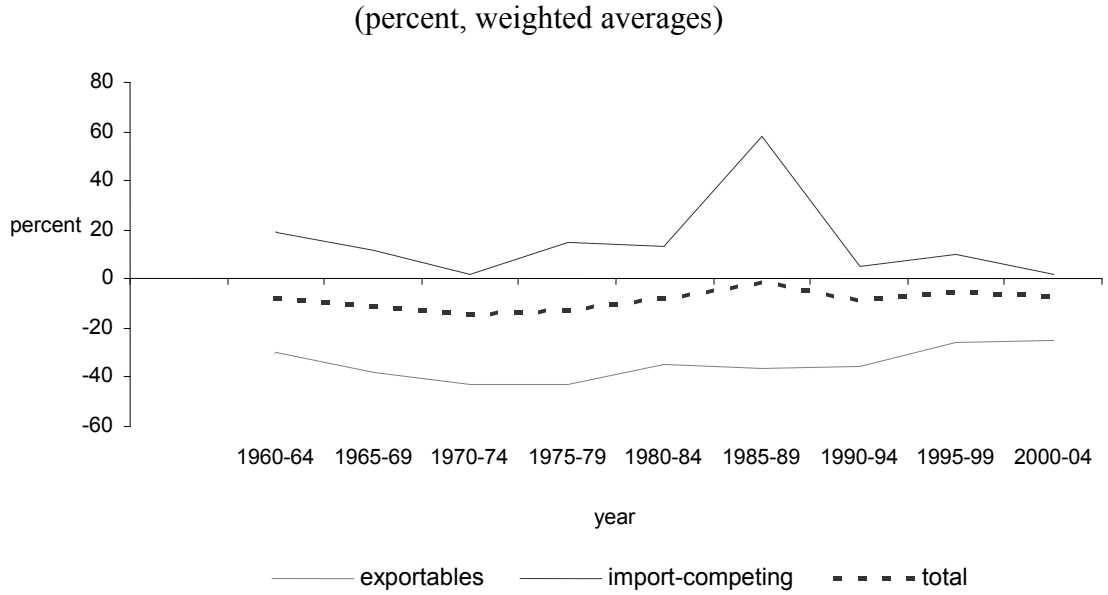
Vousden, N. (1990), *The Economics of Trade Protection,* Cambridge: Cambridge University Press.

Winters, L.A., N. McCulloch and A., McKay (2004), "Trade Liberalization and Poverty: The Empirical Evidence", *Journal of Economic Literature* 62(1): 72-115, March.

World Bank (2007), *World Development Report 2008: Agriculture for Development*, Washington DC: World Bank.

World Bank (2008), *World Development Indicators*, Washington DC: World Bank.

Figure 1: Nominal rates of assistance to exportable, import-competing and all[a] agricultural products, African region, 1960 to 2004

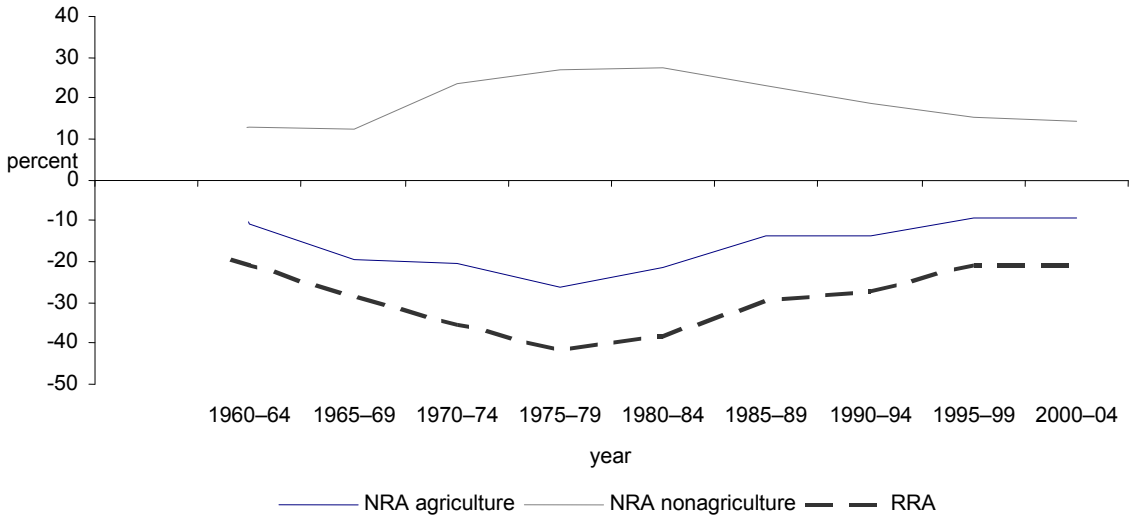


Sources: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).
a. The total NRA can be above or below the exportable and importable averages because assistance to nontradables and non-product specific assistance is also included.

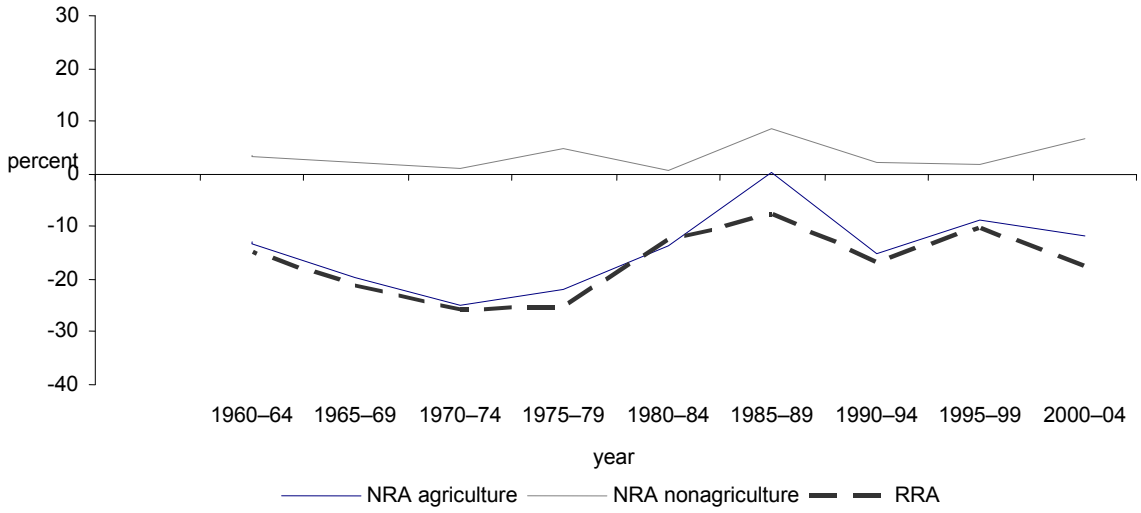
Figure 2: Nominal rates of assistance to agricultural and non-agricultural tradable products and relative rate of assistance,[a] Africa,[b] 1960 to 2004

(percent)

(a) unweighted averages across 16 countries[b]



(b) weighted averages across 16 countries[b]

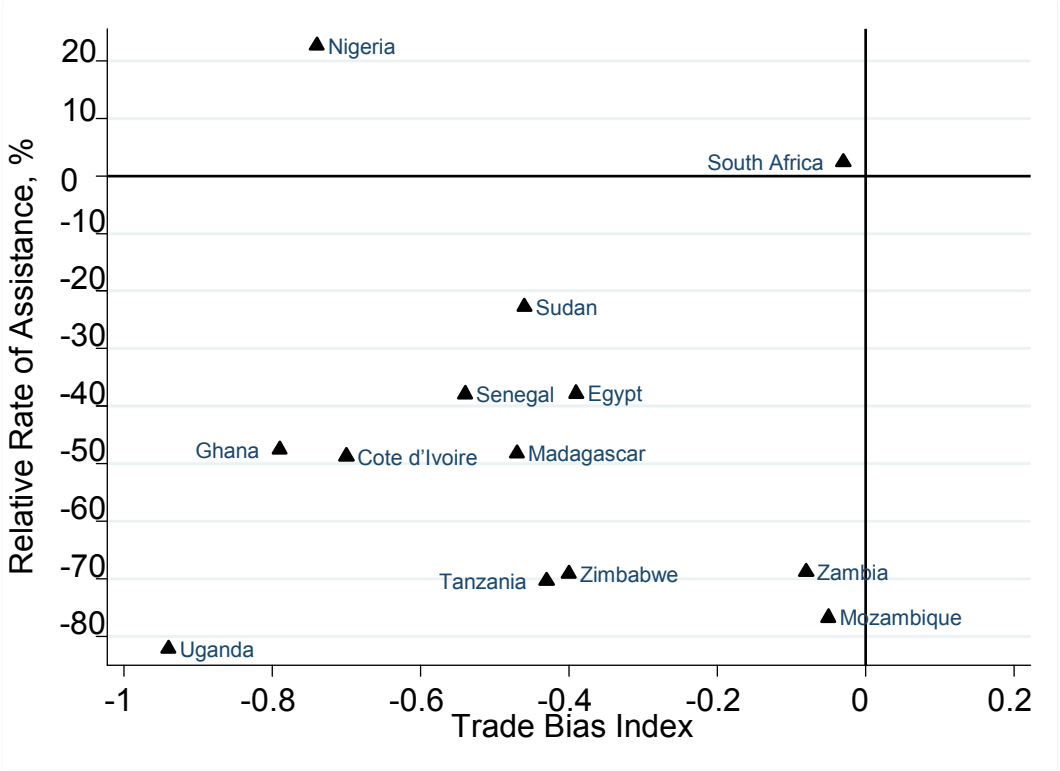


Sources: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).

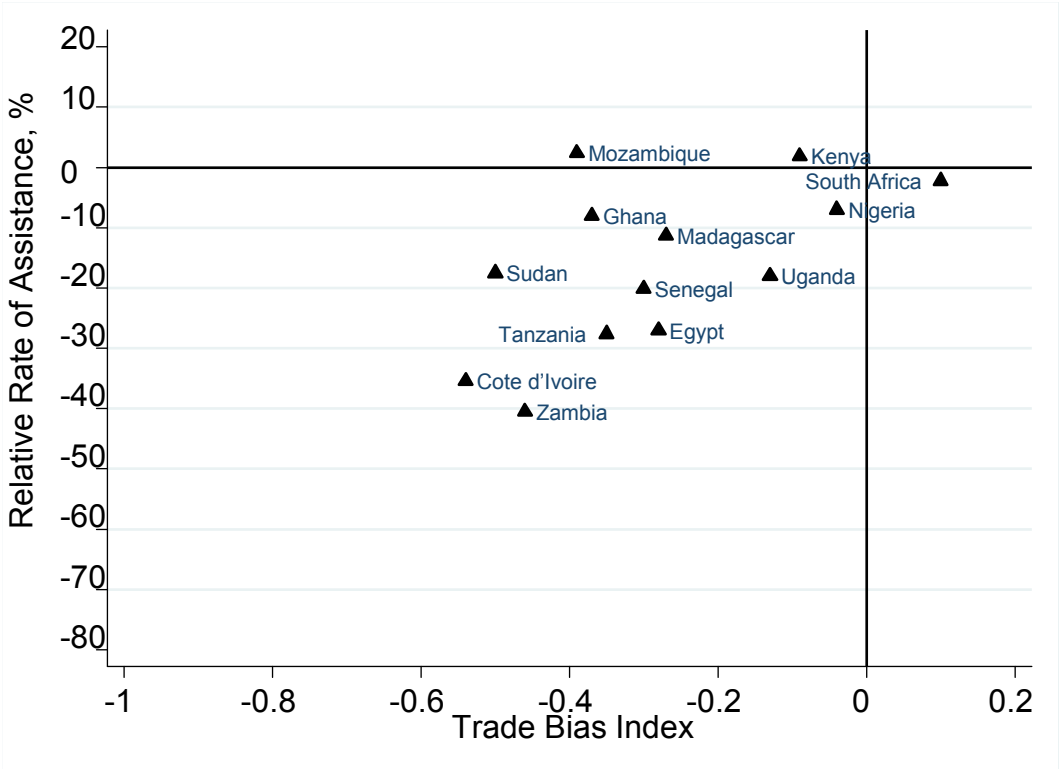
a. The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.
b. The five focus countries for which RRAs were not estimated are the cotton-exporting countries of Benin, Burkina Faso, Chad, Mali and Togo

Figure 3: Relationship between RRA and the trade bias index for agriculture, African focus countries, 1975–79 and 2000–04

a. 1975–79

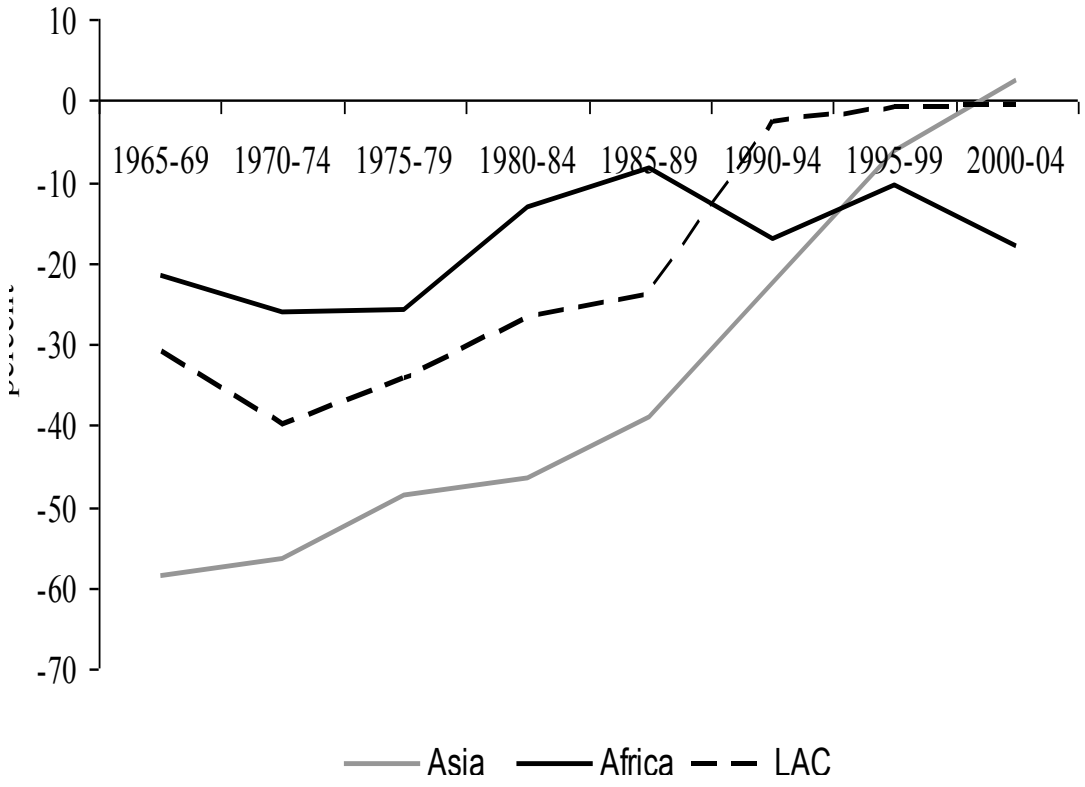


b. 2000–04



Sources: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).

Figure 4: Relative rates of assistance,[a] Africa, Asia, and Latin America,[b] 1965 to 2004
(percent)



*Source*s: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).
a. 5-year weighted averages with value of production at undistorted prices as weights.
b. In Asia, estimates for China pre-1981 are based on the assumption that the nominal rate of assistance to agriculture in those earlier years was the same as the average NRA estimates for China in 1981-89.

Table 1: Key economic and trade indicators, African focus countries, 2000-04

	Share (%) of world:			National rel. to world (=100)			Pov[b]	Gini Index[c]
	Pop'n	Total GDP	Agric GDP	GDP per capita	Ag land per capita	RCA[a] ag & food	2004	
Benin	0.12	0.01	0.09	7	55	1034	31	39
Burkina Faso	0.19	0.01	0.09	5	111	953	29	40
Cameroon	0.25	0.03	0.38	13	74	445	15	45
Chad	0.14	0.01	0.07	5	695	na	na	na
Cote d'Ivoire	0.28	0.04	0.21	12	139	722	18	48
Egypt	1.13	0.26	1.11	23	6	175	2	34
Ethiopia	1.08	0.02	0.23	2	58	958	12	30
Ghana	0.33	0.02	0.2	6	88	748	17	41
Kenya	0.52	0.04	0.29	8	103	636	12	43
Madagascar	0.28	0.01	0.1	5	202	670	63	47
Mali	0.2	0.01	0.1	5	353	624	39	40
Mozambique	0.3	0.01	0.08	4	324	359	30	47
Nigeria	1.98	0.15	1.09	8	73	3	71	44
Senegal	0.17	0.02	0.09	10	94	444	13	41
South Africa	0.73	0.42	0.39	59	275	134	9	58
Sudan	0.55	0.05	0.5	8	490	209	na	na
Tanzania	0.58	0.03	0.33	5	166	800	56	35
Togo	0.09	0	0.05	5	80	407	na	na
Uganda	0.42	0.02	0.15	4	60	938	83	46
Zambia	0.18	0.01	0.07	7	398	194	60	51
Zimbabwe	0.21	0.04	0.14	18	200	602	62	50
African focus countries	**9.73**	**1.21**	**5.74**	**13**	**145**	**na**	**na**	**na**
All Sub-Saharan Africa	**9.37**	**0.98**	**4.93**	**10**	**164**	**na**	**41**	**na**
All North Africa	**2.34**	**0.70**	**2.81**	**30**	**84**	**na**	**na**	**na**
All Africa	**11.71**	**1.67**	**7.74**	**14**	**148**	**na**	**32**	**na**

Source: Sandri, Valenzuela and Anderson (2008), compiled mainly from World Bank's *World Development Indicators.*

a. Revealed Comparative Advantage = share of agriculture and processed food in national exports as a ratio of that sector's share of global exports

b. Percentage of population living on <US$1/day, from Chen and Ravallion (2007).

c. Gini Indices for the most recent year available between 2000 and 2004 in the World Bank's *World Development Indicators*.

Table 2: Nominal rates of assistance to agriculture,[a] African focus countries, 1955 to 2004[c]
(percent)

	Region	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Cameroon	W	na	-2.9	-6.0	-7.4	-14.4	-11.2	-2.4	-1.1	-1.3	-0.1
Cote d'Ivoire	W	na	-23.5	-29.3	-28.1	-30.8	-32.2	-24.3	-19.5	-20.0	-24.5
Egypt	N	-23.2	-33.9	-37.7	-37.5	-15.9	-9.2	56.6	-6.1	4.0	-6.1
Ethiopia	E	na	na	na	na	na	-17.5	-22.3	-24.4	-17.8	-11.2
Ghana	W	-4.4	-9.0	-19.8	-14.9	-25.6	-21.2	-6.3	-1.7	-3.0	-1.4
Kenya	E	26.6	23.0	9.7	-11.8	-1.7	-18.6	10.5	-5.8	2.4	9.3
Madagascar	S	0.2	-5.9	-11.1	-13.5	-27.1	-38.8	-18.2	-5.4	-2.9	1.0
Mozambique	S	na	na	na	na	-34.5	-25.2	-32.0	-2.7	3.9	12.4
Nigeria	W	na	20.7	11.9	6.7	6.3	9.4	8.2	3.9	0.4	-5.4
Senegal	W	na	-9.3	-7.2	-22.4	-22.7	-20.5	4.7	5.6	-6.1	-7.5
South Africa	S	na	4.1	9.4	-0.7	3.8	22.9	11.7	10.8	5.7	-0.1
Sudan	E	-11.7	-20.4	-31.8	-43.4	-24.3	-29.3	-35.4	-47.8	-24.5	-11.9
Tanzania	E	na	na	na	na	-41.8	-56.3	-45.3	-25.2	-23.2	-12.4
Uganda	E	na	-1.8	-3.1	-7.8	-17.6	-6.2	-6.8	-0.6	0.5	0.4
Zambia	S	na	na	-22.4	-15.8	-37.3	-2.7	-58.9	-30.8	-28.6	-28.5
Zimbabwe	S	16.9	-27.2	-25.5	-26.0	-28.6	-24.0	-24.1	-24.9	-20.8	-38.7
African focus countries:											
Unweighted average[b]		na	-7.8	-12.5	-12.9	-15.5	-13.7	-8.9	-8.7	-6.6	-6.0
Weighted. average[a]		na	-7.7	-11.3	-14.7	-12.7	-7.9	-1.0	-8.9	-5.7	-7.3
Dispersion of individual country agric NRAs [c]		na	13.4	15.1	14.3	17.1	21.2	29.5	16.1	12.3	13.5

Sources: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).

a. Weighted average for each country, including product-specific output and input distortions and non-product-specific assistance as well as authors' guesstimates for non-covered farm products, with weights based on gross value of agricultural production at undistorted prices. Cameroon, Cote D'Ivoire, Nigeria, Senegal, Uganda and Zambia data under 1960-64 are 1961-64; Tanzania data under 1975-79 are 1976-79; and Ethiopia data under 1980-84 are 1981-84.

b. The unweighted average is the simple average across the 16 countries of their national NRA (weighted) average NRAs.

c. Dispersion is a simple 5-year average of the annual standard deviation around a weighted mean of the national agricultural sector NRAs each year.

Table 3: Dispersion of nominal rates of assistance across covered agricultural products within each African focus country,[a] 1955 to 2004

(percent)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Cameroon	na	14	18	22	29	21	17	16	13	8
Cote d'Ivoire	na	25	28	33	46	33	33	26	23	33
Egypt	22	15	17	21	32	32	90	33	29	22
Ethiopia	na	na	na	na	na	26	28	28	29	24
Ghana	10	17	30	29	48	70	56	26	17	26
Kenya	33	26	31	21	27	22	24	23	25	26
Madagascar	na	31	25	25	38	39	42	39	30	23
Mozambique	na	na	na	na	35	36	40	29	33	38
Nigeria	na	113	95	94	90	92	94	83	73	53
Senegal	na	20	16	34	45	38	59	67	14	19
South Africa	26	18	19	25	32	43	35	32	20	20
Sudan	34	35	34	36	40	32	54	75	41	63
Tanzania	na	na	na	na	39	39	41	47	47	52
Uganda	na	8	12	29	47	39	41	8	7	7
Zambia	na	15	30	27	36	35	35	39	36	38
Zimbabwe	75	71	47	37	28	28	24	25	25	34
African focus countries:										
Unweighted average[b]	33	31	31	33	41	39	45	37	29	30
Product coverage [c]	*68*	*73*	*72*	*72*	*70*	*67*	*66*	*66*	*66*	*68*

Sources: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).

a. Dispersion for each country is a simple 5-year average of the annual standard deviation around a weighted mean of NRAs across covered products each year. Cameroon, Cote D'Ivoire, Nigeria, Senegal, Uganda and Zambia data under 1960-64 are 1961-64; Tanzania data under 1975-79 are 1976-79; and Ethiopia data under 1980-84 are 1981-84.

b. The unweighted average is the simple average across the 16 countries of their 5-year simple average dispersion measures.

c. Share of gross value of total agricultural production, valued at undistorted prices, accounted for by covered products.

Table 4: Nominal rates of assistance, key covered farm products, all African focus countries,[a] 1955 to 2004

(percent, weighted averages)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Banana	na	-2	-4	0	-2	-1	-1	3	5	1
Bean	na	6	2	-3	-39	-53	-66	-25	-24	-25
Beef	-13	-21	-29	-37	4	11	23	-38	-1	-26
Cassava	0	0	0	0	1	2	1	-1	-3	-3
Cocoa	-14	-27	-54	-48	-60	-52	-36	-35	-32	-36
Coffee	-11	-27	-36	-44	-62	-53	-42	-37	-21	-12
Cotton	-16	-41	-53	-54	-49	-43	-31	-54	-38	-46
Groundnut	-29	-27	-38	-51	-46	-44	-17	-30	-36	-40
Maize	-4	12	3	-7	-12	1	38	8	2	-5
Milk	-35	-22	-32	-42	-1	-22	67	-27	-8	15
Millet	-77	-19	-6	-4	-1	1	0	1	-3	-2
Palmoil	na	-25	-31	-44	-17	-25	-12	108	41	-13
Plantain	0	0	0	0	0	0	0	0	0	0
Poultry	na	-13	-13	-16	-24	18	-3	6	13	3
Rice	-62	-38	-39	-22	-14	-14	29	0	-8	-5
Sesame	-40	-53	-64	-65	-68	-60	-48	-48	-50	-38
Sheepmeat	-12	-14	-18	-22	-21	-20	-37	-49	-45	-21
Sorghum	-35	62	87	49	28	17	41	37	23	21
Soybean	na	na	-14	-30	-43	-43	-40	-53	-50	-54
Sugar	-22	-6	11	-24	-11	-1	42	2	7	44
Sunflower	na	15	17	6	7	16	7	6	-6	-4
Tea	3	9	-7	-20	-30	-34	-29	-40	-28	-16
Tobacco	na	-42	-38	-45	-54	-47	-48	-38	-34	-63
Vanilla	na	-62	-53	-39	-57	-76	-85	-78	-28	-13
Wheat	-13	-27	-13	-6	12	-5	19	4	1	-1
Yam	0	0	0	0	1	1	0	-1	-4	-3
All covered products	**-19.9**	**-13.0**	**-17.8**	**-22.1**	**-20.3**	**-12.1**	**0.9**	**-12.4**	**-6.6**	**-8.9**

Sources: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).

Table 5: Nominal rates of assistance to agricultural relative to non-agricultural industries, African region, 1960 to 2004

(percent, weighted averages)

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04
Covered products	-13.0	-17.8	-22.1	-20.3	-12.1	0.9	-12.4	-6.6	-8.9
Non-covered products	3.6	1.8	-0.2	-0.3	-3.3	-7.6	-4.8	-5.1	-5.2
All agricultural products	-8.4	-12.2	-15.6	-13.8	-9.5	-2.0	-10.0	-6.1	-7.7
Total agricultural NRA (incl. NPS)[b]	-7.7	-11.3	-14.7	-12.7	-7.9	-1.0	-8.9	-5.7	-7.3
Trade Bias Index[c]	-0.41	-0.45	-0.44	-0.50	-0.43	-0.60	-0.39	-0.33	-0.26
Assistance to just tradables:									
All agricultural tradables[b]	-13.3	-19.6	-25.0	-22.1	-13.5	-0.3	-15.4	-8.7	-12.0
All non-agricultural tradables	3.7	2.7	1.5	5.7	1.6	9.2	2.7	2.0	7.3
Relative rate of assistance, RRA[a]	-15.2	-21.4	-26.0	-25.9	-13.1	-8.3	-17.1	-10.4	-18.0
MEMO, ignoring exchange rate distortions:									
Total agricultural NRA	-5.2	-7.3	-11.6	-8.9	-3.7	5.6	-6.7	-5.6	-6.2
Trade bias index, all agric.	-0.14	-0.17	-0.16	-0.29	-0.05	-0.26	-0.01	0.30	0.20
Relative rate of assistance, RRA[a]	-9.7	-13.4	-17.7	-17.0	-2.7	5.9	-12.7	-11.8	-16.1

Sources: Anderson and Valenzuela (2008) based on estimates reported in Anderson and Masters (2009).

a. RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

b. NRAs including non-product-specific (NPS) assistance, that is, the assistance to all primary factors and intermediate inputs as a percentage of the total primary agricultural production valued at undistorted prices.

c. Trade Bias Index is $TBI = (1+NRAag_x/100)/(1+NRAag_m/100) - 1$, where $NRAag_m$ and $NRAag_x$ are the average percentage NRAs for the import-competing and exportable parts of the agricultural sector. The regional average TBI is calculated from the regional averages of the NRAs for exportable and import-competing parts of the agricultural sector.

Table 6: Relationships between nominal rates of assistance and some of its determinants,[c] African focus countries, 1960 to 2004

Explanatory variable	(1)	(2)	(3)	(4)
Ln GDP per capita	0.13*	0.14*	0.18*	0.17*
	(0.04)	(0.04)	(0.06)	(0.06)
Ln GDP per capita squared	0.49*	0.51*	0.50*	0.54*
	(0.06)	(0.05)	(0.08)	(0.08)
Importable		0.08*	0.15*	0.13*
		(0.02)	(0.02)	(0.02)
Exportable		-0.33*	-0.30*	-0.31*
		(0.01)	(0.02)	(0.02)
Revealed Comparative Advantage[a]				0.02*
				(0.01)
Trade Specialization Index[b]			0.09*	
			(0.04)	
Constant	-0.14*	-0.38*	-0.42*	-0.40*
	(0.04)	(0.04)	(0.05)	(0.08)
R^2	0.13	0.27	0.28	0.28
Number of observations	5372	5372	3788	3838
Country fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes

Source: Authors‘ estimates

a. Revealed comparative advantage index is the share of agriculture and processed food in national exports as a ratio of that sector‘s share of global exports (world=1).

b. Net exports as a ratio of the sum of exports and imports of agricultural and processed food products (world=1).

c. Dependent variable for regressions is NRA by commodity, country and year. Results are OLS estimates, with standard errors in parentheses and significance levels shown at the 99%(*). The main explanatory variable is ln GDP per capita in $10,000s.

Table 7: Indicators of domestic food market insulation,[a] five products, Africa and other focus countries, 1970 to 2004

	sugar			**coffee**			**cotton**			**rice**			**maize**		
	SD	CV	Z	SD	CV	Z	SD	CV	Z	SD	CV	Z	SD	CV	Z
International ref price[d]	**376.8**	**0.93**	**338**	**1788.5**	**0.58**	**1211**	**976.1**	**0.41**	**549.6**	**283**	**0.63**	**203**	**75.6**	**0.44**	**38.2**
Benin	na	na	na	na	na	na	0.09	0.51	0.09	na	na	na	na	na	na
Burkina Faso	na	na	na	na	na	na	0.09	0.56	0.11	na	na	na	na	na	na
Cameroon	na	na	na	0.41	0.69	0.35	0.13	0.68	0.15	na	na	na	5.79	1.57	2.55
Chad	na	na	na	na	na	na	0.09	0.59	0.10	na	na	na	na	na	na
Cote d'Ivoire	na	na	na	0.39	0.98	0.35	0.20	1.10	0.14	0.89	1.06	0.67	na	na	na
Egypt	0.08	0.57	0.06	na	na	na	0.37	0.95	0.53	0.41	0.73	0.47	2.02	1.23	2.98
Ethiopia	na	na	na	0.38	0.64	0.40	na	na	na	na	na	na	0.66	1.89	0.68
Ghana	na	na	na	na	na	na	na	na	na	1.09	0.73	1.59	1.94	1.07	4.48
Kenya	0.02	0.25	0.01	1.18	1.03	1.14	na	na	na	na	na	na	0.70	0.52	0.93
Madagascar	0.03	0.43	0.02	0.37	1.03	0.51	na	na	na	0.27	0.48	0.38	2.34	1.41	3.59
Mali	na	na	na	na	na	na	0.08	0.51	0.11	na	na	na	na	na	na
Mozambique	0.03	0.54	0.02	na	na	na	0.09	1.24	0.12	0.36	1.16	0.54	0.88	1.16	1.58
Nigeria	na	na	na	na	na	na	0.46	3.24	0.43	1.34	0.89	1.06	4.15	1.36	4.95
Senegal	na	na	na	na	na	na	0.10	0.59	0.11	0.41	0.54	0.37	na	na	na
South Africa	0.03	0.37	0.02	na	na	na	na	na	na	na	na	na	0.63	0.59	0.74
Sudan	0.84	0.57	0.46	na	na	na	0.50	1.73	0.75	na	na	na	na	na	na
Tanzania	0.01	0.38	0.01	0.49	1.00	0.50	0.09	0.83	0.14	0.44	0.60	0.47	0.85	0.75	1.77
Togo	na	na	na	na	na	na	0.11	0.63	0.10	na	na	na	na	na	na
Uganda	0.54	1.60	0.66	0.10	0.83	0.11	0.09	0.83	0.13	1.09	0.97	1.46	1.48	1.59	3.90
Zambia	na	na	na	na	na	na	0.26	1.41	0.28	0.55	0.98	0.57	0.81	0.98	1.28
Zimbabwe	na	na	na	na	na	na	0.24	1.07	0.27	na	na	na	0.50	0.70	0.82
Africa[e]	0.18	0.51	0.12	0.48	0.88	0.46	0.34	1.37	0.44	0.62	0.73	0.61	1.19	1.20	1.49
Asia[e]	0.32	0.52	0.16	0.68	1.19	0.70	0.27	1.59	0.30	0.28	0.76	0.25	0.44	0.71	0.58
Latin America[e]	0.02	0.40	0.01	0.52	0.83	0.56	0.27	1.07	0.30	0.43	0.78	0.40	0.87	0.86	1.06
Developing countries[e]	0.21	0.48	0.11	0.52	0.88	0.55	0.29	1.46	0.34	0.29	0.76	0.26	0.73	0.87	0.92
High-income countries[e]	0.06	0.45	0.06	na	na	na	0.72	0.87	0.68	2.08	0.56	1.50	0.96	1.07	1.03
World[e]	0.19	0.47	0.11	0.52	0.87	0.55	0.51	1.33	0.53	0.43	0.75	0.35	0.83	0.95	0.98

[a] SD is the ratio of two standard deviations (respectively around the period mean price domestically, and internationally); CV is the ratio of two coefficients of variation (which in turn is the standard deviation divided by the period mean), again one referring to the domestic price and the other to the international price; and Z is the ratio of two z-statistics (which is the square root of the average squared deviation of the price from its value lagged one period, or the first differences in price — see Schiff and Valdes 1992, Appendix 3-2), again one referring to the domestic price and the other to the international price. The smaller these indicators are as a fraction of unity, the more stable is the domestic price relative to the international price. Both international and domestic country-level prices are expressed in $US and in real terms using the 2000 US GDP deflator. Regional sub-totals are weighted using the national product-level values of production at undistorted prices. The international reference prices are the following from the World Bank's Commodity Outlook series:
Sugar: International Sugar Agreement (ISA) daily price, raw, f.o.b. and stowed at greater Caribbean ports
Coffee: International Coffee Organization indicator price, Robusta, average New York and Le Havre/Marseilles markets, ex-dock
Cotton: "Cotlook A index" middling 1-3/32 inch, average of cheapest 5 of 15 styles traded in Northern Europe, c.i.f.
Rice: Thai, 5% broken, white rice (WR), milled, indicative price based on weekly surveys of export transactions, government standard, f.o.b. Bangkok
Maize: US, no. 2, yellow, f.o.b. US Gulf ports.

Source: Anderson, Croser, Nelgen and Valenzuela (2009).